

# PATENT ABSTRACTS OF JAPAN

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## (54) TONER FOR DEVELOPING ELECTROSTATIC CHARGE IMAGE

### (57)Abstract:

PURPOSE: To obtain a toner having high coloring power, satisfactory blocking resistance and anti-offsetting property.

CONSTITUTION: This toner contains at least a bonding resin, a colorant, a polar resin and amide wax represented by the formula, wherein each of X1 and X2 is a 9-45C org. group, X1 and X2 may be different from each other and each of X1 and X2 may have an unsatd. group.



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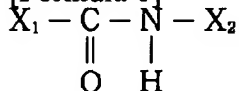
CLAIMS

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[Claim(s)]

[Claim 1] The toner for electrostatic-charge image development characterized by expressing this amide wax with the following structure expression in the toner for electrostatic-charge image development which contains binding resin, a coloring agent, polar resin, and an amide wax at least.

[Formula 1]



[X1 and X2 may be organic radicals which have carbon numbers 9-45, Xtwo may be the same as Xone, or there may not be, and X1 and X2 may have the partial saturation radical.]

[Claim 2] The toner for electrostatic-charge image development according to claim 1 characterized by a toner being a polymerization toner.

[Claim 3] The toner for electrostatic-charge image development according to claim 2 to which this amide wax is characterized by being connotation-ized in the coat resin layer by the fault plane measuring method of the toner using a transmission electron microscope (TEM).

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the toner for electrostatic-charge image development suitable for the heat fixation used for a xerography, an electrostatic recording method, and magnetic recording.

[0002]

[Description of the Prior Art] Although it is known for many approaches as conventionally indicated by a U.S. Pat. No. 2,297,691 description, JP,42-23910,B, JP,43-24748,B, etc. as a xerography Generally use the photoconductivity matter and an electric latent image is formed on a photo conductor with various means. Subsequently, develop this latent image using a toner and a direct or indirect means is used if needed. After imprinting a toner image to imprint material, such as paper, it is established with heating, a pressure, heating application of pressure, or a solvent steam, and a duplication is not obtained, the toner which imprinted and remained on the photo conductor is cleaned by various approaches, and an above-mentioned process is repeated.

[0003] Furthermore, if how to form a common full color image is explained, the photo conductor of a photo conductor drum is charged in homogeneity with a primary electrification vessel, the laser light modulated with the Magenta picture signal of a manuscript performs image exposure, an electrostatic latent image is formed on a photoconductor drum, this electrostatic latent image will be developed with the Magenta development counter which holds a Magenta toner, and a Magenta toner image will be formed. Next, the Magenta toner image developed at the aforementioned photoconductor drum is imprinted using a direct or indirect means with an imprint electrification vessel to the conveyed imprint material.

[0004] On the other hand, the photo conductor drum after developing the aforementioned electrostatic latent image After discharging electricity with the electrification vessel for electric discharge and cleaning with a cleaning means, It is again charged with a primary electrification vessel, and the cyanogen toner image to the imprint material which imprinted formation of a cyanogen toner image and the aforementioned Magenta toner image similarly is imprinted, it carries out still like a yellow color and a black color one by one, and the toner image of four colors is imprinted to imprint material. A full color image is formed by establishing the imprint material which has the toner image of these four colors in an operation of heat and a pressure with a fixing roller.

[0005] Such [ in recent years ] equipment is not only called copying machine for paperwork for copying the mere original copy manuscript generally said, but began to be used in the field of the personal copy for the printers or individuals as an output of a computer.

[0006] The expansion to the regular paper facsimile to which the basic engine was applied besides the field represented by such laser beam printer is also accomplishing development rapidly.

[0007] therefore -- more -- small -- more -- a light weight -- and -- more -- a high speed -- more -- high definition -- more, high-reliability is investigated severely and a machine consists of simpler elements increasingly in respect of versatility. The engine performance required of a toner becomes altitude more,

and if the improvement in the engine performance of a toner cannot be attained, the more excellent machine is stopping consequently, realizing. Moreover, in order for the need over a color copy to also increase rapidly and to copy an original copy color picture more faithfully in connection with the needs of copies various in recent years, still much more high definition, high resolution, etc. are desired. Furthermore, the demand to the copy of a double-sided original copy color copy has also been increasing.

[0008] The toner used for the image formation approach of this color needs for the melting nature and color mixture nature at the time of impressing heat to be good to this, and it is more desirable than these viewpoints that softening temperature uses the high toner of the low Sharp melt nature of melt viscosity low.

[0009] That is, by using this Sharp melt toner, the color reproduction range of a duplication can be spread and a color copy faithful to a manuscript image can be obtained.

[0010] However, generally the high color toner of such Sharp melt nature has high compatibility with a fixation roller, and is in the inclination which is easy to offset to a fixing roller at the time of fixation.

[0011] Since a Magenta, cyanogen, yellow, black, and a two or more layers toner layer are formed on imprint material in the case of the anchorage device especially in color picture formation equipment, it is in the inclination which offset tends to generate especially from buildup of toner thickness.

[0012] In order to be the object which does not make a toner adhere to a fixing roller front face conventionally, for example, to form a roller front face by the ingredient and silicone rubber which were excellent in the mold-release characteristic to the toner, fluorine system resin, etc. and to prevent fatigue of offset prevention and a roller front face on the front face further, covering a roller front face with the thin film of the high liquid of the mold-release characteristic like silicone oil and fluorine oil is performed. However, the evil in which short life-ization of a fixation roller is promoted on a lifting result target hangs around breakaway between the layers from which this oil spreading constitutes the fixing roller not to mention having troubles, like an anchorage device becomes complicated since the equipment for supplying the liquid for offset prevention although it is very effective at the point that this approach prevents offset of a toner is required.

[0013] Then, the approach of adding release agents, such as low molecular weight polyethylene and low molecular weight polypropylene, in a toner is proposed from the idea of supplying an offset prevention liquid out of a toner instead at the time of heating without using the feeder of silicone oil etc.

[0014] Making a wax contain as a release agent in a toner is known. For example, the technique is indicated by JP,52-3304,B, JP,52-3305,B, JP,57-52574,A, etc.

[0015] Moreover, the technique of making JP,3-50559,A, JP,2-79860,A, JP,1-109359,A, JP,62-14166,A, JP,61-273554,A, JP,61-94062,A, JP,61-138259,A, JP,60-252361,A, JP,60-252360,A, JP,60-217366,A, etc. containing waxes is indicated.

[0016] Development nature gets worse, and although waxes are used for improvement in the offset-proof nature at the time of the low temperature of a toner, and an elevated temperature, and the improvement in fixable at the time of low temperature, when blocking resistance is worsened, or it was exposed to heat according to the temperature up of a copying machine etc. and a toner is left on the other hand over a long period of time, a wax and development nature gets worse. [ a toner front face ]

[0017] The expectation which starts development of a new toner to such a problem was a so-called size.

[0018] The suspension-polymerization method toner is proposed to the above-mentioned technical problem (JP,36-10231,B). After setting by this suspension-polymerization method, making homogeneity dissolve or distribute a polymerization nature monomer and a coloring agent (for the need to be accepted further and for them to be a polymerization initiator, a cross linking agent, an electrification control agent, and other additives) and considering as a monomer constituent, distribute this monomer constituent using an agitator suitable in the continuous phase (for example, aqueous phase) containing a distributed stabilizer, a polymerization reaction is made to perform to coincidence, and the toner particle which has a desired particle size is obtained.

[0019] this suspension-polymerization method -- if -- the polarity of water -- size -- since the drop of a monomer constituent is made to generate in a dispersion medium, the component which has the polar

group contained in a monomer constituent tends to exist in the surface section which is an interface with the aqueous phase, and the component of a non-polarity can be made the so-called core/shell structure of not existing in the surface section

[0020] The toner by the describing [ above ] polymerization method becomes possible [ preventing elevated-temperature offset ], without becoming possible to be compatible in the opposite engine performance of blocking resistance and elevated-temperature-proof offset nature, and applying release agents, such as oil, to a fixing roller by connotation-ization of the wax which is a release agent.

[0021] manufacturing a resin particle by the system which excepted the release agent out of the monomer first, adding a wax emulsion into the drainage system, and making a release agent adhere to a resin particle front face besides the polymerization toner by the above-mentioned approach -- oil spreading -- it is also possible to give fixable [ unnecessary ] (JP,6-180511,A).

[0022] However, by these approaches, a satisfying thing is not obtained about contamination of blocking resistance, the development sleeve by the wax, or a photo conductor.

[0023] As stated also in advance, a user's need over both-sides-izing of the copy of a double-sided original copy manuscript or the original copy manuscript of one side is large in recent years, therefore the double-sided image with nearby high definition and high-reliability is called for.

[0024] While there are various evils in the technique over conventional color both sides, there is paper curl generated after the 1st page is fixed to one of the problems of the utmost importance. If this paper curl is large, the conveyance nature of a fixation image will be remarkably inferior, and an image with high definition and high-reliability will not be obtained. On the other hand, it is how to be able to obtain the high definition image with which it was [ image concentration color repeatability, etc. ] satisfied of the amount of imprints of the toner to imprint material in few conditions as engine performance required of a toner, for example. Improvement in own tinting strength of a toner is needed for this. Moreover, in both sides, since the image which passes a fixing assembly twice arises, the further improvement in elevated-temperature-proof offset nature is also needed.

[0025]

[Problem(s) to be Solved by the Invention] The object of this invention is to offer the toner for electrostatic-charge image development which solved the trouble like the above.

[0026] Another object of this invention has good pigment dispersibility, and it is to offer the large toner for electrostatic-charge image development of tinting strength.

[0027] Another object of this invention is to offer the toner for electrostatic-charge image development excellent in the offset-proof nature (for it to be able to set especially to improvement in the speed) to imprint material.

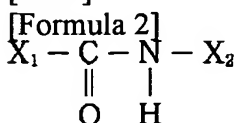
[0028] Furthermore, another object of this invention is to offer the toner for electrostatic-charge image development which can be established without [ without it applies a lot of oil, or ] completely applying oil.

[0029] Furthermore, another object of this invention is to offer the toner for electrostatic-charge image development excellent in blocking resistance.

[0030]

[Means for Solving the Problem and its Function] This invention relates to the toner for electrostatic-charge image development characterized by expressing this amide wax with the following structure expression in the toner for electrostatic-charge image development which contains binding resin, a coloring agent, polar resin, and an amide wax at least.

[0031]



[0032] [X1 and X2 may be organic radicals which have carbon numbers 9-45, Xtwo may be the same as Xone, or there may not be, and X1 and X2 may have the partial saturation radical.]

[0033] Furthermore, it is related with the toner for electrostatic-charge image development characterized by the above-mentioned toner being a polymerization toner.

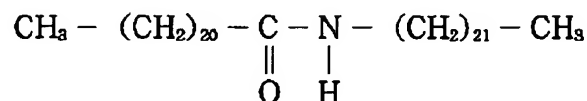
[0034] Furthermore, in the above-mentioned polymerization toner, this amide wax is related with the toner for electrostatic-charge image development characterized by being connotation-ized in the coat resin layer by the fault plane measuring method of the toner using a transmission electron microscope (TEM).

[0035] More specifically, the following amide wax is mentioned. In addition, it is not limited to this.

[0036]

[Formula 3]

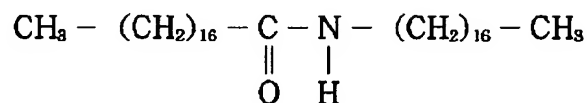
アミドワックス1



[0037]

[Formula 4]

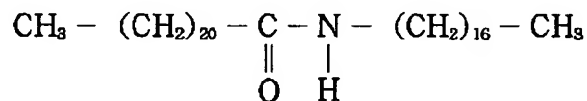
アミドワックス2



[0038]

[Formula 5]

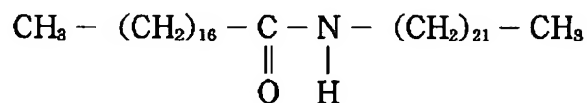
アミドワックス3



[0039]

[Formula 6]

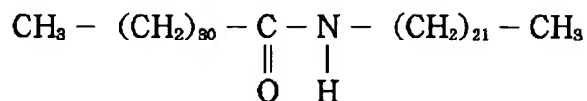
アミドワックス4



[0040]

[Formula 7]

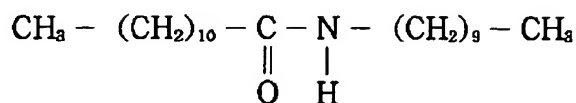
アミドワックス5



[0041]

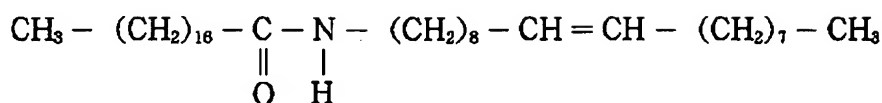
[Formula 8]

アミドワックス6



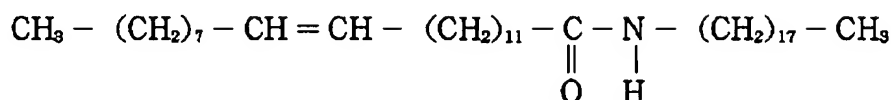
[0042]

[Formula 9]

アミドワックス7

[0043]

[Formula 10]

アミドワックス8

[0044] From having a polar group, the amide wax used for these this inventions has a coloring agent and moderate compatibility in order to make good tinting strength discover, consequently it is excellent in the dispersibility of the coloring agent in a toner. Furthermore, this invention persons found out excelling in fixable in the high-speed fixation which cannot require the heat from a fixing assembly for the toner layer on imprint material easily at the time of fixation paying attention to being excellent in quick melting, i.e., the Sharp melt nature, in melting point temperature, if this amide wax heats. When especially used for the polymerization toner of the structure like this invention, unlike the common grinding toner, in the elevated-temperature section, it checked excelling in elevated-temperature-proof offset nature by sustained-release [ from the interior of a toner of this amide wax ]. Moreover, as for the carbon number of the amide wax of the above-mentioned structure, 9 to 45 is desirable, and 15 to 22 is desired more preferably. If a satisfying thing is not obtained in the viewpoint of elevated-temperature-proof offset nature and 45 is exceeded when a carbon number is less than nine, lowering of the stabilization effect of the particle when corning a monomer system will be seen, and good granulation nature will not be obtained. Moreover, the direction is more desirable although the part of partial saturation may exist in an organic radical, and only saturation exists from a viewpoint of the formation of wax connotation.

[0045] By carrying out the polymerization of the mixture which has a polymerization nature monomer, a coloring agent, and an amide wax, it is desirable 5 - 40 weight section and to carry out the 10-30 weight section activity of the amide wax more preferably to the polymerization nature monomer 100 weight section in the polymerization method toner process which obtains a toner particle directly.

[0046] Since the polarity is lower than binder resin, in the polymerization method in the inside of a drainage system medium, since the release agent usually used in a polymerization method toner process compared with a dry type toner process tends to make a lot of release agents connotation-ize inside a toner particle, it becomes possible [ using a lot of release agents generally ] as compared with a dry type toner process, and becomes especially effective in the offset prevention effectiveness at the time of fixation.

[0047] If there are few additions of an amide wax than a minimum, the offset prevention effectiveness will tend to fall, and in the case where an upper limit is exceeded, the blocking-proof effectiveness falls, and it is easy to have an adverse effect also on the offset-proof effectiveness, and is in the inclination for a lifting and the toner with still larger particle size distribution in the case of a polymerization method toner to like to generate drum welding and sleeve welding.

[0048] As for the melting point of the amide wax used for this invention, it is desirable that it is 50-150 degrees C, and its 60-80 degrees C are especially more preferably desirable. case the melting point is lower than 50 degrees C -- the blocking resistance of a toner -- many -- the contamination tightness of the sleeve pollution control and the photo conductor in the time of the copy of several sheets tends to



fall. When the melting point exceeds 150 degrees C, in the process of the toner by the grinding method, excessive energy is needed for homogeneity mixing with binder resin, the proof-pressure reaction container under utilization and the high voltage of retarder thinner is needed also in the process of the toner by the another side polymerization method, and equipment becomes very complicated and is not desirable.

[0049] The approach of computing a solubility parameter (SP) value using the approach [Polym.Eng.Sci., 14(2) 147 (1974)] of Fedors using the additive property of an atomic group is mentioned.

[0050] As for SP value of the amide wax used for this invention, it is desirable that it is the range of 7.5-9.8. Compatibility with the binder resin to be used is hard to acquire good distribution into binder resin as a result deficiently, adhesion to the development sleeve of an amide wax tends to produce the amide wax which SP value shows less than 7.5 value at the time of several multi-sheet copy, and the amount of electrifications of a toner becomes easy to change. Furthermore, the concentration fluctuation at the time of ground fogging toner makeup etc. is a lifting and a cone. In using the amide wax with which SP value exceeds 9.8, when the mothball of the toner is carried out, it is easy to generate blocking of toners. Furthermore, since compatibility with binder resin is too good, it is hard to form mold-release characteristic layer sufficient between a fixation member and a toner binder resin layer at the time of fixation, and they are a lifting and a cone about an offset phenomenon.

[0051] the melt viscosity of the amide wax used for this invention -- the product made from HAAKE -- the approach of measuring at 130 degrees C VP-500 using a cone plate mold rotor (PK-1) is mentioned. The melt viscosity in 130 degrees C has especially the desirable amide wax compound with which that it is 1-310cPs has 3-50cPs desirable still more preferably. When it has melt viscosity lower than 1cPs, in case thin layer coating of the toner layer is carried out with a blade etc. by the nonmagnetic 1 component development method at a sleeve, it is easy to cause sleeve contamination by the mechanical ZURI force. Moreover, in case a toner is developed using a carrier also in the 2 component development approach, it is easy to produce a damage according to the ZURI force between a toner and a carrier, and it is easy to produce flaking, toner crushing, etc. of an external additive. In having the melt viscosity exceeding 310cPs(es), in case it manufactures a toner using a polymerization method, it is not easy to obtain the toner of minute particle size with which the viscosity of a dispersoid has past [ the high one ] and a uniform particle size, and it tends to serve as a large toner of particle size distribution.

[0052] The measuring method with which for example, a Shimazu dynamic super-micro hardness tester (DUH-200) is used for the determination of hardness of an amide wax is mentioned. After carrying out 10-micrometer variation rate of the Measuring condition at a 9.80mg [/second ] load rate under 0.5g load using the Vickers indenter, it asks for Vickers hardness by analyzing the dent which was made to hold for 18 seconds and was attached on the sample. A sample casts the sample beforehand fused using metal mold with a diameter [ phi ] of 20mm in the shape of [ of 5mm thickness ] a cylinder, and uses it. As for especially the Vickers hardness with the range desirable still more desirable [ the degree of hardness of the release agent used for this invention ] of 0.3-5.0, 0.5-3.0 are effective.

[0053] The toner containing an amide wax lower than Vickers hardness 0.3 is easy to be crushed by the cleaning part of a copying machine in several multi-sheet copy, and a lifting and as a result of becoming empty, a black line tends to generate toner welding on an image on a target at a drum front-face top. Moreover, when multiplex \*\*\*\*\* of the image sample is carried out, a toner imprints at the rear face, and the so-called flesh-side projection is easy to generate and is not desirable. The toner containing the amide wax with which Vickers hardness exceeds 5.0 is not need the welding pressure beyond the need for the fixing assembly used at the time of heating fixation, and needed [ beyond the need / on the strength ] for a fixing assembly, and desirable. Usually, if the fixing assembly of welding pressure is used, offset-proof nature will not be easy to fall and be desirable.

[0054] The amidation condensation reaction generally known is used as the manufacture approach of the amide wax used for this invention.

[0055] A desirable toner is manufactured using the direct polymerization method the amide wax was connotation-ized in the coat resin layer, by the fault plane measuring method of the toner which used the

transmission electron microscope (TEM) rather than it is used for this invention. It is necessary to make an inevitable amide wax connotation-ize in coat resin from the need of making a toner containing a lot of amide waxes from a fixable viewpoint. If special frost shattering is not used in a grinding process, sufficient pulverizing-ization cannot be performed, but only the large thing of particle size distribution will be obtained as a result, but the toner when not making it connotation-ize also generates the toner welding to equipment, and is not very desirable. Moreover, in frozen grinding, when equipment makes it complicated for the dew condensation preventive measure to equipment or a toner absorbs moisture temporarily, workability lowering of a toner is caused, and it is also necessary to add a desiccation process further, and becomes a problem. As a concrete method of making an amide wax connotation-ize, the amide wax can be small set up for the polarity of the ingredient in the inside of a drainage system medium from main monomers, and the toner which has the so-called core shell structure which covered the amide wax with making still a small amount of polar big resin or polar big monomer add by coat resin can be obtained. Particle-size-distribution control of a toner and control of particle size can obtain the toner of predetermined this invention by controlling churning conditions, such as an approach of changing the class and addition of the dispersant which carries out the mineral salt of difficulty water solubility, and a protective colloid operation, and mechanical contrivance conditions, for example, peripheral speed, a count of pass, an impeller configuration, etc. of a rotor, a container configuration or the solid content concentration in the inside of a water solution, etc.

[0056] after use 43 osmium <8> oxide together according to 43 ruthenium oxide and a need and dye the hardened material which might make it harden for two days in an ambient atmosphere with a temperature of 40 degrees C after distribute a toner enough in the epoxy resin of room temperature setting nature as a concrete approach of measure the fault plane of a toner in this invention, the sample of a thin film integrated circuit be started using the microtome equipped with the diamond gear tooth, and the fault gestalt of a toner be measured using the transmission electron microscope (TEM). In this invention, in order to attach the contrast between ingredients using the difference in the degree of crystallinity of the some of the amide wax to be used and the resin which constitutes a coat, it is desirable to use a 43 ruthenium-oxide staining technique. A typical example is shown in drawing 1. It was observed that the amide wax is clearly connotation-ized by coat resin.

[0057] When using the direct polymerization approach for the toner manufacture approach of this invention, it is possible to manufacture a toner concretely by the manufacture approach like a less or equal. The additive of an amide wax, a coloring agent, an electrification control agent, a polymerization initiator, and others is added into a monomer, and the usual agitator or a homomixer, a homogenizer, etc. are made to distribute the monomer system homogeneity was made to dissolve or distribute by the homogenizer, an ultrasonic disperser, etc. in the aqueous phase containing a distributed stabilizer. An agitating speed and time amount are adjusted and corned so that a monomer drop may have the size of a desired toner particle preferably. What is necessary is just to perform after that churning which is extent with which a particle condition is maintained and sedimentation of a particle is prevented according to an operation of a distributed stabilizer. Generally, polymerization temperature is set as the temperature of 50-90 degrees C, and performs 40 degrees C or more of polymerizations. Moreover, temperature up may be carried out in the second half of a polymerization reaction, and in order to remove the unreacted polymerization nature monomer which becomes a stinking cause of a thing at the time of toner fixation etc. further, a by-product, etc., a drainage system medium may be distilled off in part after second half of reaction, or reaction termination. Washing and filtration recover the generated toner particle after reaction termination, and it dries. In a suspension-polymerization method, it is desirable to usually use water 300 - the 3000 weight sections as a dispersion medium to the monomer system 100 weight section.

[0058] moreover, when obtaining a direct toner using a polymerization method As a polymerization nature monomer Styrene, o (m-, p-)methyl styrene, m Styrene monomer [, such as (p-)ethyl styrene, ]; A methyl acrylate, (Meta) An ethyl acrylate, (Meta) Acrylic-acid propyl, (Meta) Butyl acrylate, (Meta) Acrylic-acid octyl, (Meta) Acrylic-acid dodecyl, (Meta) Acrylic-acid stearyl, (Meta) Acrylic-acid behenyl, (Meta) 2-ethylhexyl acrylate, (Meta) Acrylic ester (meta) system monomers, such as acrylic-

acid dimethylaminoethyl and an acrylic-acid (meta) diethylaminoethyl; (Meta) En system monomers, such as a butadiene, an isoprene, a cyclohexene, acrylonitrile (meta), and an acrylic-acid amide, are used preferably.

[0059] In this invention, in order to make core shell structure form, it is indispensable to use polar resin together and the polar polymer and copolymer which can be used for this invention are illustrated below.

[0060] A copolymer with polymers, such as unsaturated carboxylic acid, such as halogen-containing monomers, such as nitril monomers, such as a copolymer with the polymer of nitrogen-containing monomers, such as dimethylaminoethyl methacrylate and diethylaminoethyl methacrylate, or styrene-unsaturated-carboxylic-acid ester and acrylonitrile, and a vinyl chloride, an acrylic acid, and a methacrylic acid, other partial saturation dibasic acids, a partial saturation dibasic-acid anhydride, and a nitro monomer, or a styrene monomer, polyester, an epoxy resin, etc. are mentioned. As a more desirable thing, styrene, the copolymer of an acrylic acid (meta), a maleic-acid copolymer and saturated polyester resin, and an epoxy resin are mentioned.

[0061] As a polymerization initiator, for example 2 and 2'-azobis - (2,4-dimethylvaleronitrile), - azobisisobutyronitril, and 2 and 2'1, 1'-azobis (cyclohexane-1-carbonitrile), 2 and 2'-azobis-4-methoxy-2,4-dimethylvaleronitrile, Azo systems, such as azobisisobutyronitril, or a diazo series polymerization initiator, benzoyl peroxide, Methyl-ethyl-ketone peroxide, diisopropyl peroxy carbonate, Cumene hydroperoxide, tert butylhydroperoxide, G t-butyl peroxide, JIKUSHIRU peroxide, 2, 4-dichlorobenzoyl peroxide, A lauroyl peroxide, 2, and 2-bis(4 and 4-t-butylperoxy cyclohexyl) propane, Persulfate, such as a macromolecule initiator which has peroxide system initiators and peroxides, such as tris-(t-butylperoxy) triazine, in a side chain, potassium persulfate, and ammonium persulfate, a hydrogen peroxide, etc. are used.

[0062] The addition of a polymerization initiator of 0.5 - 20 weight section of a polymerization nature monomer is desirable, and is independent, or may use it together.

[0063] Moreover, in order to control molecular weight in this invention, a well-known cross linking agent and a chain transfer agent may be added, and it is 0.001 - 15 weight section as a desirable addition.

[0064] In this invention, any or a suitable stabilizer is used for the dispersion medium used by the polymerization method using an emulsion polymerization, a distributed polymerization, a suspension polymerization, a seed polymerization, and a hetero condensation method etc. in case a polymerization method toner is manufactured. For example, tricalcium phosphate, magnesium phosphate, aluminium phosphate, phosphoric-acid zinc, a calcium carbonate, a magnesium carbonate, a calcium hydroxide, a magnesium hydroxide, an aluminum hydroxide, a meta-calcium silicate, a calcium sulfate, a barium sulfate, a bentonite, a silica, an alumina, etc. are mentioned as an inorganic compound. As an organic compound, the sodium salt of polyvinyl alcohol, gelatin, methyl cellulose, methyl hydroxypropylcellulose, ethyl cellulose, and a carboxymethyl cellulose, polyacrylic acid and its salt, starch, polyacrylamide, polyethylene oxide, the Pori (hydro oxy-stearin acid-g-methyl-methacrylate-eu-methacrylic acid) copolymer, the Nonion system or an ion system surfactant, etc. is used.

[0065] Moreover, when using an emulsion-polymerization method and a hetero condensation method, an anion system surface active agent, a cation system surface active agent, an amphionic surface active agent, and the Nonion system surface active agent are used. As for these stabilizers, it is desirable to use 0.2 - 30 weight section to the polymerization nature monomer 100 weight section.

[0066] In order to obtain a fine particle, this inorganic compound may be made to generate in a dispersion medium, although a commercial thing may be used as it is when using an inorganic compound in these stabilizing agents.

[0067] Moreover, the surfactant of the 0.001 - 0.1 weight section may be used for detailed distribution of these stabilizing agents. This is a thing for promoting an expected operation of the above-mentioned distributed stabilizing agent, and a dodecylbenzene sodium sulfate, the sodium tetradecyl sulfate, a pentadecyl sodium sulfate, an octyl sodium sulfate, sodium oleate, lauryl acid sodium, a stearin acid potassium, oleic acid calcium, etc. are mentioned as the example.

[0068] Moreover, it is better to perform hydrophobing processing which needs to pay attention to the polymerization inhibition nature and the aqueous-phase translatability which a coloring agent has as a coloring agent used for a polymerization method toner in this invention, and does not have surface treatment, for example, polymerization inhibition, preferably in said coloring agent. Since especially a color system and carbon black have many which have polymerization inhibition nature, they require caution in the case of an activity. As a desirable approach of carrying out surface treatment of the color system, the approach of carrying out the polymerization of the polymerization nature monomer beforehand is listed to the bottom of existence of these colors, and the obtained coloring polymer is added in a monomer system. Moreover, carbon black may be processed with the surface functional group of carbon black besides the same processing as the above-mentioned color, and reactant, for example, polyorganosiloxane etc.

[0069] The toner of this invention may contain an electrification control agent.

[0070] There is the following matter to control a toner to negative electrification nature.

[0071] For example, an organometallic compound and a chelate compound are effective and there are metallic compounds of monoazo metallic compounds, acetylacetonate metallic compounds, an aromatic series hide ROKISHI carboxylic acid, and an aromatic series die carboxylic-acid system. There are other phenol derivatives, such as an aromatic series hide ROKISHI carboxylic acid, aromatic series monochrome, polycarboxylic acid and its metal salt, an anhydride, ester, and a bisphenol.

[0072] Moreover, a urea derivative, a metal-containing salicylic-acid system compound, a metal-containing naphthoic-acid system compound, a boron compound, quaternary ammonium salt, carixarene, a silicon compound, a styrene-acrylic-acid copolymer, a styrene-methacrylic-acid copolymer, a styrene-acrylic-sulfonic-acid copolymer, a non metal carboxylic-acid system compound, etc. are mentioned.

[0073] There is the following matter to control a toner to forward electrification nature.

[0074] The denaturation object by Nigrosine, a fatty-acid metal salt, etc., a guanidine compound, an imidazole compound, Tributyl benzyl ammonium-1-hydroxy-4-naphth sulfonate, Quaternary ammonium salt, such as tetrabutylammonium tetrafluoroborate, And onium salt and these lake pigments, triphenylmethane dye, and these lake pigments (as a lake-ized agent), such as phosphonium salt which is these analogs A \*\*\*\* tungstic acid, a \*\*\*\* molybdic acid, a \*\*\*\* tungsten molybdic acid, A tannic acid, a lauric acid, a gallic acid, a ferricyanide, ferrocyanide, etc., The metal salt of a higher fatty acid; Dibutyltin oxide, dioctyl tin oxide, JIORUGANO tin oxide [, such as dicyclohexyl tin oxide, ]; -- JIORUGANO tin borate [, such as dibutyltin borate, dioctyl tin borate, and dicyclohexyl tin borate, ]; -- these -- independent -- or two or more kinds can be combined and it can use. Also in these, the Nigrosine system and the electrification control agent like quaternary ammonium salt are used especially preferably.

[0075] These electrification control agents are good to carry out a 0.01-20 weight section (preferably 0.5 - 10 weight section) activity to the resinous principle 100 weight section.

[0076] As for the coloring agent used for this invention, that by which toning was carried out black using carbon black, the magnetic substance, and the yellow / Magenta / cyanogen coloring agent that shows below is used as a black coloring agent.

[0077] As a yellow coloring agent, the compound represented by a condensation azo compound, an isoindolinone compound, the Anthraquinone compound, an azo metal complex, a methine compound, and the allyl compound amide compound is used. Specifically, the C.I. pigment yellow 12, 13, 14, 15, 17, 62, 74, 83, 93, 94, 95, 109, 110, 111, 128, 129, and 147 and 168 grades are used suitably.

[0078] As a Magenta coloring agent, a condensation azo compound, a diketo pyrrolo pyrrole compound, anthraquinone, the Quinacridone compound, a base color lake compound, a naphthol compound, a bends imidazolone compound, a thioindigo compound, and a perylene compound are used. The C.I. pigment red 2, 3, 5, 6, 7, and 23, 48; 2, 48; 3, 48; 4, 57; 1, 81; 1, and 122, 146, 166, 169, 177, 184, 185, 202, 206, 220, 221 and 254 are especially specifically desirable.

[0079] As a cyanogen coloring agent used for this invention, a copper-phthalocyanine compound and its derivative, an anthraquinone compound, a base color lake compound, etc. can be used. Specifically, the

C.I. pigment blues 1, 7, 15, 15:1, 15:2, 15:3, 15:4, 60, and 62 and 66 grades can use suitably especially. these coloring agents are independent -- or it can mix and can use in the state of the solid solution further. The coloring agent of this invention is chosen from the point of a hue angle, saturation, lightness, weatherability, OHP transparency, and the dispersibility to the inside of a toner. To the resin 100 weight section, the addition of this coloring agent carries out 1-20 weight section addition, and is used.

[0080] Furthermore, the toner of this invention makes a magnetic material contain further, and can be used also as a magnetic toner. In this case, a magnetic material can also serve as the role of a coloring agent. In this invention, the alloy of a metal like the aluminum of ferrous-oxide; iron, such as magnetite, hematite, and a ferrite, cobalt, metals like nickel, or these metals, cobalt, copper, lead, magnesium, tin, zinc, antimony, beryllium, a bismuth, cadmium, calcium, manganese, a selenium, titanium, a tungsten, and vanadium as a magnetic material contained in a magnetic toner, its mixture, etc. are mentioned.

[0081] By the surface treatment agent which is the matter without polymerization inhibition, when the magnetic substance by which surface treatment was carried out is desired more preferably and it uses for a polymerization method toner, if hydrophobing processing is performed, what kind of thing is sufficient as the magnetic substance used for this invention, and it can mention a silane coupling agent, a titanium coupling agent, etc. as such a surface treatment agent, for example.

[0082] An average particle has [ these ferromagnetics ] an about 0.1-0.5-micrometer preferably desirable thing 2 micrometers or less. as the amount made to contain in a toner -- the resinous principle 100 weight section -- receiving -- the about 20 to 200 weight section -- the 40 - 150 weight section is especially preferably good to the resinous principle 100 weight section.

[0083] Moreover, the thing of coercive force (Hc)20-300 oersted, saturation magnetization (sigmas) 50 - 200 emu/g, and residual magnetization (sigmar) 2 - 20 emu/g has the desirable magnetic properties in 10K oersted impression.

[0084] It is desirable that it is 1/5 or less particle size of the volume mean diameter of the point of the endurance when adding to the inside of a toner or a toner to a toner particle as an additive aiming at various toner property grants. The particle size of this additive means that mean particle diameter for which it asked by surface observation of the toner particle in an electron microscope. As an additive aiming at these property grant, the following is used, for example.

[0085] As a fluid grant agent, they are metallic-oxide carbon black (silicon oxide, an aluminum oxide, titanium oxide, etc.), fluoride carbon, etc. Respectively, what performed hydrophobing processing is more desirable.

[0086] As an abrasive material, metallic oxides (strontium titanate, cerium oxide, an aluminum oxide, a magnesium oxide, chrome oxide, etc.), nitrides (silicon nitride etc.), carbide (silicon carbide etc.), and metal salts (a calcium sulfate, a barium sulfate, calcium carbonate, etc.) are mentioned.

[0087] As lubricant, fluororesin powder (vinylidene fluoride, polytetrafluoroethylene, etc.), fatty-acid metal salts (zinc stearate, calcium stearate, etc.), etc. are mentioned.

[0088] As an electrification controllability particle, metallic oxides (tin oxide, titanium oxide, a zinc oxide, silicon oxide, aluminum oxide, etc.), carbon black, etc. are mentioned.

[0089] 0.1 - 10 weight section is used to the toner particle 100 weight section, and, as for these additives, 0.1 - 5 weight section is used preferably. These additives may be used independently or may be used together. [ two or more ]

[0090] The toner of this invention can usually be used for any developer as one component and a binary system developer.

[0091] For example, as an one component system developer, in the case of the magnetic toner which made the magnetic substance contain in a toner, the magnet made to build in in a development sleeve is used, and there is a method of making it a magnetic toner conveyed and charged in it. Moreover, in using the nonmagnetic toner which does not contain the magnetic substance, there is the approach of making it convey by carrying out frictional electrification compulsorily with a development sleeve, and making a toner adhere on a sleeve using a blade and a fur brush.

[0092] In using as a binary system developer generally used on the other hand, it uses it as a developer

with the toner of this invention using a carrier. Although not limited especially as a carrier used for this invention, it mainly consists of independent and the complex ferrite conditions which consist of iron, copper, zinc, nickel, cobalt, manganese, and a chromium element. The point that saturation magnetization and electric resistance are broadly controllable to a carrier configuration is also important, for example, it is desirable to choose a globular shape, flatness, an infinite form, etc. and to control further, the fine structure, for example, surface uneven nature, of a carrier surface state. Although the approach of coating resin is generally used after generating a carrier core particle beforehand by calcinating and corning the above-mentioned inorganic oxide To the approach of grinding and classifying and obtaining a low consistency distribution carrier from the implications which mitigate the load to the toner of a carrier after kneading an inorganic oxide and resin, and a pan It is possible to use the approach of obtaining the polymerization carrier which carries out the suspension polymerization of the kneading object of a direct inorganic oxide and a monomer in a drainage system medium, and obtains a real ball-like distribution carrier etc.

[0093] Especially the system that covers the front face of the above-mentioned carrier with resin etc. is desirable. Each well-known approach, such as an approach of making covering material, such as resin, dissolve or suspend, applying it into a solvent, and making it adhering to a carrier as the approach, and the approach of only mixing by fine particles, can apply conventionally.

[0094] Although it changes with toner ingredients as fixing matter on the front face of a carrier, although it is appropriate independent or to use the metallic compounds of polytetrafluoroethylene, a monochloro trifluoro ethylene polymer, polyvinylidene fluoride, silicone resin, polyester resin, and a JITASHA reeve chill salicylic acid, styrene resin, acrylic resin, a polyamide, a polyvinyl butyral, Nigrosine, amino acrylate resin, basic dye and its lake, silica impalpable powder, alumina impalpable powder, etc. by plurality, it is not necessarily restrained by this, for example.

[0095] Generally the throughput of the above-mentioned compound has 0.1 - 30 desirable % of the weight (preferably 0.5 - 20 % of the weight) to a carrier in a total amount.

[0096] As for the mean particle diameter of these carriers, it is preferably desirable to have 20-50 micrometers 10-100 micrometers.

[0097] As an especially desirable mode, it is the ferrite of the 3 yuan system of Cu-Zn-Fe. The combination of the resin like fluororesin and styrene resin, for example, polyvinylidene fluoride, styrene-methylmetaacrylate resin; polytetrafluoroethylene, and styrene-methylmetaacrylate resin, the front face They are 90:10-20:80, and the thing preferably used as the mixture of the ratio of 70:30-30:70 about fluorine system copolymer and styrene system copolymer; etc. 0.01 to 5% of the weight, it coats 0.1 to 1% of the weight preferably, and that whose carrier particle of 250-mesh pass and 400-mesh-on is the coat ferrite carrier which has a certain above-mentioned mean particle diameter 70% of the weight or more is mentioned. A vinylidene fluoride-tetrafluoroethylene copolymer (10:90-90:10) is illustrated as this fluorine system copolymer, and a styrene-2-ethylhexyl acrylate (20:80-80:20) and styrene-2-ethylhexyl acrylate-methyl methacrylate (20-60:5-30:10-50) is illustrated as a styrene system copolymer.

[0098] Particle size distribution is sharp, desirable frictional electrification nature is obtained to the toner of this invention, and the above-mentioned coat ferrite carrier is effective in raising electrophotographic properties further.

[0099] When mixing with the toner in this invention and preparing a two component developer, if the mixed ratio is preferably carried out to 4 % of the weight - 13% of the weight as toner concentration in a developer 2 % of the weight to 15% of the weight, a usually good result will be obtained. It becomes at less than 2 % of the weight, image concentration is low, and impossible to use toner concentration, fogging and scattering inside the plane are made to increase in the case where it exceeds 15%, and it is shorter \*\* about the useful life longevity of a developer.

[0100] Furthermore, the magnetic property of this carrier has the good following. The intensity of magnetization ( $\sigma_{1000}$ ) in 1000 oersteds after making it saturated magnetically needs to be 30 thru/or 300 emu/cm<sup>3</sup>. In order to attain high definition-ization furthermore, it is good that they are 100 thru/or 250 emu/cm<sup>3</sup> preferably. In being larger than 300 emu/cm<sup>3</sup>, a high definition toner image



becomes is hard to be obtained. In order that magnetic restraint may also decrease that they are less than three 30 emu/cm, it is easy to produce carrier adhesion.

[0101] Moreover, the manufacturing method of the polymerization toner used by this invention The approach of atomizing melting mixture in air using a disk or many hydraulic nozzles given in JP,56-13945,B etc., and obtaining a spherical toner, The approach of generating a direct toner using the suspension-polymerization method stated to JP,36-10231,B, JP,59-53856,A, and JP,59-61842,A, The emulsion-polymerization method represented by the soap free polymerization method which carries out direct polymerization to a monomer under the distributed polymerization method the meltable and obtained polymer generates a direct toner using an insoluble drainage system organic solvent, or water-soluble polarity polymerization initiator existence, and generates a toner, After making a primary polarity emulsion-polymerization particle beforehand, it is possible to manufacture a toner using the hetero condensation method which the polar particle which has a reverse charge is added [ condensation method ] and makes it meet.

[0102] However, in a distributed polymerization method, although the toner obtained shows very sharp particle size distribution, from a viewpoint concerning [ selection of the ingredient to be used being narrow or utilization of an organic solvent ] processing of a waste solvent, and the inflammability of a solvent, its manufacturing installation is complicated and tends to make it complicated. Although the emulsion-polymerization method represented by the soap free polymerization is effective since the particle size distribution of a toner gather comparatively, when the emulsifier and initiator end which were used exist in a toner particle front face, it is easy to worsen environmental capability.

[0103] Especially the suspension-polymerization method under application of pressure is under the ordinary pressure from which a particle toner with sharp particle size distribution is obtained comparatively easily in this invention or is desirable. After making a monomer stick to the once obtained polymerization particle further, the so-called seed polymerization method which carries out a polymerization using a polymerization initiator can also be used suitable for this invention.

[0104] The assessment approach of the tinting strength in this invention, elevated-temperature-proof offset nature, and blocking resistance is as follows.

[0105] 1) \*\*\*\*\* -- first, to the coloring particle containing the amide wax of this invention, carry out optimum dose externally adding of the above-mentioned external additive, and obtain a developer. The non-established image of the obtained developer is created with a commercial copying machine.

[0106] It is made, as for the imprint material at this time, for the imprint weight of a toner to serve as 0.45 mg/cm<sup>2</sup> using SK paper (Nippon Paper Industries Co., Ltd. make). It is established in the heat roller external fixing assembly (phi 35) which does not have an oil spreading function in this, and is made for glossiness to become [ in the case of a magnetic toner / the glossiness of a fixation image ] 71 in the case of a color toner. In addition, as roller construction material at this time, the upper part and the lower part use the thing of a fluorine system. Measurement of glossiness used handicap glossmeter gross checkered IG-310 (Horiba, Ltd. make). Thus, it is Macbeth about the concentration of the obtained image. It measured using RD918 (made in Macbeth).

[0107] 2) To the coloring particle containing elevated-temperature-proof offset \*\*\*\*\* and the amide wax of this invention, carry out optimum dose externally adding of the above-mentioned external additive, and obtain a developer. The non-established image of the obtained developer is created with a commercial copying machine. The amount of imprints of a toner is made into 0.70 mg/cm<sup>2</sup>.

[0108] This was evaluated about elevated-temperature-proof offset nature using the heat roller external fixing assembly (phi 35) without an oil spreading function. In addition, as roller construction material at this time, the upper part and the lower part use the thing of a fluorine system. Moreover, as fixation conditions, when imprint material was SK paper (Nippon Paper Industries Co., Ltd. make), it considered as nip 7.0mm and process speed 125 mm/sec, and it carried out by applying temperature control at intervals of 5 degrees C in the 120 to 250 degrees C temperature requirement.

[0109] Elevated-temperature-proof offset nature makes temperature visually lost by that of offset the low-temperature offset starting point, and makes the maximum temperature to which raising and offset do not come out of temperature an elevated-temperature offset terminal point.

[0110] 3) 5g adds in [ of 100 cc ] Pori Kapp, and carry out standing of the toner which carried out optimum dose externally adding of the above-mentioned external additive adjusted to the particle size of a blocking resistance request for three days in a 50-degree C oven.

[0111] Using a powder circuit tester's (Hosokawa Micron CORP. make) vibrating-screen machine as a means to see coherent [ of the sample ], whenever [ condensation ] was measured and blocking resistance was evaluated.

[0112] As a measuring method, the sieve of 100mesh(es), 60mesh, and 30mesh is set to a shaking table in piles in order of the sieve of 100mesh, 60mesh, and 30mesh so that order with a narrow aperture size, i.e., 30mesh(es), may come at the most significant.

[0113] It is made to be set to 18V, a previous sample is added on this set 30mesh sieve, the input voltage to a shaking table is adjusted so that it may go into the range whose amplitude of the shaking table in that case is 60-90 micrometers, an oscillation is added for about 25 seconds, after that, the weight of the sample which remained on each sieve is measured, and whenever [ condensation ] is obtained based on a bottom type.

[0114] In addition, the degree of blocking resistance was judged with the rate of change of whenever [ condensation ] on the basis of whenever [ condensation / of the toner which is not put in into the 50-degree C drier at this time ].

[0115]

[Equation 1]

$$\begin{aligned} \text{凝集度(\%)} = & \frac{\text{30meshフルイ上の試料重量}}{5\text{g}} \times 100 \\ & + \frac{\text{60meshフルイ上の試料重量}}{5\text{g}} \times 100 \times \frac{3}{5} \\ & + \frac{\text{100meshフルイ上の試料重量}}{5\text{g}} \times 100 \times \frac{1}{5} \end{aligned}$$

[0116] Measurement environments are 23 degrees C and 65%RH.

[0117]

[Example]

After feeding 520g of 0.1 M- $\text{Na}_3\text{PO}_4$  water solutions into 730g of [example 1] ion exchange water and warming at 60 degrees C, it agitated in 12000rpm using TK type homomixer (product made from special opportunity-ized industry). 75g of 1.3 M- $\text{CaCl}_2$  water solutions was gradually added to this, and the drainage system medium containing calcium $_3(\text{PO}_4)_2$  was obtained.

[0118] On the other hand Styrene 180g n-butyl acrylate 20g A copper-phthalocyanine pigment 10g Saturated polyester resin 10g (weight average molecular weight = about 7000)

G t-butyl salicylic-acid metallic compounds 2g Wax 1 40g [0119] The above-mentioned formula was warmed at 60 degrees C, TK type homomixer (product made from special opportunity-ized industry) was used, and it dissolved and distributed to homogeneity in 12000rpm. Polymerization initiator 2 and 2'-azobis (2,4-dimethylvaleronitrile) 12g was dissolved in this, and the polymerization nature monomer constituent was prepared.

[0120] The above-mentioned polymerization nature monomer constituent was thrown in in said drainage system medium, it agitated for 15 minutes by 10000rpm by TK type homomixer under 60 degrees C and  $\text{N}_2$  ambient atmosphere, and the polymerization nature monomer constituent was corned. Then, agitating by the paddle impeller, temperature up was carried out to 70 degrees C, and it was made to react for 10 hours.

[0121] After having cooled, adding the hydrochloric acid after polymerization reaction termination and dissolving calcium phosphate, filtration, rinsing, and desiccation were carried out and the polymerization particle was obtained. When the cross section of this polymerization particle was observed by TEM, it has checked that the amide wax was connotation-ized by coat resin as shown in drawing 1.



[0122] To the obtained particle 100 weight section, the specific surface area by the BET adsorption method carried out externally adding of the hydrophobic silica 1.5 weight section which is 205m<sup>2</sup>/g, and the suspension-polymerization toner was obtained. In addition, the weighted mean particle size of the obtained cyanogen toner was 6.5 micrometers.

[0123] The ferrite carrier 95 weight section by which the acrylic coat was carried out was mixed to this toner 5 weight section, and it considered as the developer.

[0124] The assessment result was shown in a table 1.

[0125] The [examples 2-4] example 2 changes a wax into waxes 1-2, an example 3 changes a wax into waxes 1-5, and an example 4 makes it be the same as that of an example 1 except changing a wax into waxes 1-6.

[0126] After feeding 450g of 0.1 M-Na<sub>3</sub>PO<sub>4</sub> water solutions into 720g of [example 5] ion exchange water and warming at 60 degrees C, it agitated in 12000rpm using TK type homomixer (product made from special opportunity-ized industry). 70g of 1.4 M-CaCl<sub>2</sub> water solutions was gradually added to this, and the drainage system medium containing calcium<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub> was obtained.

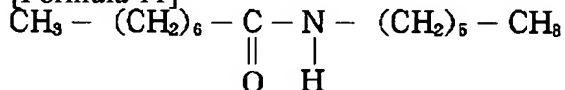
[0127] On the other hand Styrene 170g n-butyl acrylate 30g A silane coupling agent processing magnetic oxide of iron 90g (mean particle diameter = under 0.23 micrometer 10K oersted saturation magnetization = 70 emu/g residual magnetization = 18 emu/g coercive force = 120 oersted)

Styrene-methacrylic-acid-methyl methacrylate 12g (monomer weight ratio = 85:5:10 weight-average-molecular-weight = about 57000)

Divinylbenzene 2g G t-butyl salicylic-acid metallic compounds 3g Wax 2 It is referred to as 40g and the same assessment as an example 1 is carried out except this.

[0128] The example 1 of the [example 1 of comparison] comparison is the amide wax [0129] of a wax 1 to following structure about a wax.

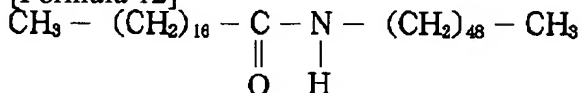
[Formula 11]



Suppose that it is the same as that of an example 1 except changing with \*\*. A result is shown in a table 1.

[0130] The example 2 of the [example 2 of comparison] comparison is the amide wax [0131] of a wax 1 to following structure about a wax.

[Formula 12]



Suppose that it is the same as that of an example 1 except changing with \*\*. A result is shown in a table 1.

[0132] The example 3 of the [example 3 of comparison] comparison presupposes that it is the same as that of an example 1 except changing a wax into a bis-AMAI DO wax (Kao wax EB-F / Kao Corp. make) from a wax 1. A result is shown in a table 1.

[0133] The example 4 of the [example 4 of comparison] comparison presupposes that it is the same as that of an example 1 except changing a wax into polyethylene wax (PE130/Hoechst A.G. make) from a wax 1. A result is shown in a table 1.

[0134] The example 5 of the [example 5 of comparison] comparison presupposes that it is the same as that of an example 5 except changing a wax into an alkylene screw fatty-acid amide wax (Hoechst wax C / Hoechst A.G. make) from a wax 1. A result is shown in a table 1.

[0135]

[A table 1]

	耐 オ フ セ ッ ト 性			着色力・分散性	耐ブロッキング性
	低温始点 [℃]	高温終点 [℃]	非オフセット領域 [℃]	画像濃度	凝集度変化率
実施例 1	150	215	65	1.34	0.29
実施例 2	150	205	55	1.33	0.33
実施例 3	150	225	75	1.31	0.15
実施例 4	150	210	60	1.33	0.12
実施例 5	165	230	65	1.52	0.09
比較例 1	150	170	20	1.30	0.55
比較例 2	150	215	65	1.29	91.38
比較例 3	150	180	30	1.01	33.96
比較例 4	150	190	40	1.05	61.08
比較例 5	165	200	35	1.26	31.19

[0136]

[Effect of the Invention] According to this invention, by containing the above-mentioned amide wax, good tinting strength can be discovered and improvement in the elevated-temperature-proof offset nature to improvement in the speed and also blocking resistance can be aimed at.

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[Translation done.]